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ABRASIVE SLEEVE HOLDER

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17 Claims. (Cl. 51—191)

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This invention relates to a rotatable holder whereon may be fitted an abrasive sleeve in the form of a flexible endless band. In particular, the present improvements are concerned with the holder itself which comprises a rotatable hub from which are extended a plurality of resilient arms which at their outer ends, either directly or through the medium of a peripheral band, support a surrounding abrasive sleeve. A feature of importance to this invention is the sleeve support which is yieldable so that, in response to a centrifugal force, it will tend to move out thereby pressing itself tightly against the surrounding sleeve. Conversely, when motionless, the support contracts to a state of relaxation, the abrasive sleeve being then readily movable on or off the holder.

Certain embodiments of this invention are set forth in the accompanying drawing in the manner following:

Figure 1 is a view in side elevation of a one-piece expansible holder fitted with a surrounding abrasive sleeve, shown as it appears when motionless;

Fig. 2 is a similar view of a one-piece expansible holder of modified construction; and

Fig. 3 shows in side elevation a still different form of holder having a hub, arms, and band formed of inter-connected pieces.

The present holder in the form of Fig. 1 comprises a central hub **50** from which is extended a plurality of resilient arms **51** each having at its outer end an arcuate portion **52** which is concentric with the axis of the hub. These several arcuate end portions collectively constitute a peripheral band for the holder. Through the center of the hub a bushing or shaft B may be embedded to adapt the holder for attachment to a shaft or chuck whereby rotary motion is transmitted thereto. An abrasive sleeve S which is placed around the holder is supported and driven thereby when the holder is in operation.

In the construction of Fig. 1, the hub, arms, and band are shown as formed integrally of one piece of resilient material, such as rubber. The arms which are extended radially outwardly from the hub are integrally joined to the arcuate end portions **52** which terminate at their free ends in inwardly extending flanges **53**, each disposed adjacent the next adjacent arm.

When at rest, the holder will be relaxed, i. e. it will be neither contracted nor expanded, its diameter then being such that the abrasive sleeve S may be easily slipped on or off by twisting the sleeve in the direction in which the arms

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extend. When a rotary force is applied to its hub, the arms will be pulled around to transmit this force to the peripheral band which tends to expand with increase in the centrifugal force that is developed, the arms offering little or no resistance to this expanding movement of the band. Since the abrasive sleeve is relatively non-stretchable, the expanded band will press closely and tightly against the inner face of the sleeve at every point whereby to establish a secure driving connection therewith. The sleeve may accordingly be depended upon to rotate with the holder without slipping.

When pressed against a piece of work, the peripheral band will tend to flatten at the point where engagement takes place. There is accordingly a potential substantial area of contact between the abrasive sleeve and the work, instead of merely a line contact as in cases where the holder is incapable of yielding.

The arcuately curved portions **52** form a nearly uniform peripheral layer or sectional band so that the centrifugal force is substantially uniform at all points. Although the arcuately curved portions **52** of the arms come quite close to one another, any danger that they will telescope with one another is prevented by the flanges **53**. The slight spacing between the arms, or between the free end of one arm and the radial portion of the next arm, permits a very easy reduction in size of the holder below its natural size when twisting the sleeve onto the holder by rotating the sleeve in the direction that the arms extend. This is desirable because it facilitates applying the sleeve even though the holder is large enough in its relaxed size to hold the sleeve quite reliably.

In Fig. 2 the holder comprises a hub formed with an axial opening **60**, and provided with integral arms **61** having arcuately curved portions **62** terminating in relatively heavy end portions **63**. The arms are separated by slots **64** opening into apertures **65**. The sleeve will be gripped with an enhanced force due to the relatively heavy masses **63** at the free ends of the arms.

In Fig. 3 a form of the invention is shown which is particularly appropriate for larger sizes of sleeves S. In this form is a hub **70** in whose axial opening may be received a bushing or shaft B. The hub is provided with keyhole slots **71** into which oppositely bowed arms **72** are fitted, each branch of the arm being integral with a curved portion **73** concentric with the axis of the hub **70**. The form of arms in this construction is perhaps the most uniformly flexible of all, but